Understanding the effects of tree group size on wildlife abundance and occupancy

Restoration treatments modify existing forest structure and may affect wildlife species and other components of the ecosystem in various ways. For example, tree thinning may reduce vertical structure for nesting birds, but an increase of herbaceous vegetation following prescribed fire may provide improved foraging conditions for herbivores and/or insectivores. Thus, when developing forest management plans, it is critical to identify the structural and compositional features of the forest that are important to wildlife.

The tassel-eared squirrel (*Sciurus aberti*) has received particular attention in this respect. Dodd (2003) proposed a forest treatment approach that addressed both wildlife and forest management needs, and the approach was first implemented on the Mountainaire Project near Flagstaff. It included a combination of full restoration (through extensive tree thinning), an intermediate level of thinning, and embedded "winter core areas" (WCAs) where tree density remained high to benefit the squirrels. These WCAs were 44-79 acres in size and characterized by a tree basal area >150 ft^2/acre, >50% canopy closure with interlocking canopies, and >120 trees/acre >18 in diameter at breast height (dbh). The WCAs were embedded within larger treatment blocks containing areas of full restoration or intermediate levels of thinning. Though specific to the habitat needs of tassel-eared squirrels, WCAs were also expected to benefit a variety of other species that prefer a more closed-canopy habitat.

Recently, a large-scale collaborative effort has taken shape to direct forest restoration on extensive portions of four national forests in Arizona (on Coconino, Kaibab, Tonto and Apache-Sitgreaves National Forests). This effort, the Four Forest Restoration Initiative (4FRI), proposes to treat a total of 2.4 million acres of ponderosa pine forest, with a goal to treat 30,000 acres annually over a 20 year span. 4FRI presents a unique opportunity to build on Dodd's pilot studies and to conduct a rigorous management experiment to inform future restoration efforts and their impacts on wildlife. Thus, the Research Branch has designed a research project to develop feasible WCA options for implementation in large-scale restoration efforts like 4FRI and to test wildlife responses to these treatments.

Objectives:

1. Recalibrate tassel-eared feeding sign regression equation used for estimating tassel-eared squirrel abundance in treated forest areas.
2. Determine the optimal WCA size for songbirds and tassel-eared squirrels.
3. Determine species composition and abundance pre- and post-treatment of tassel-eared squirrels and songbirds.

This project is being conducted in the 4FRI project area in Region 2 that includes parts of GMUs 6A, 6B, 7E, 7W, 8, and 11M. This project is scheduled to take 3 years from 2013 to 2016.

Project Contacts

Fenner Yarborough, Wildlife Specialist III, 928-607-8504, ryarborough@azgfd.gov
Larisa Harding, Terrestrial Research Program Manager, 623-236-7301, lharding@azgfd.gov

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